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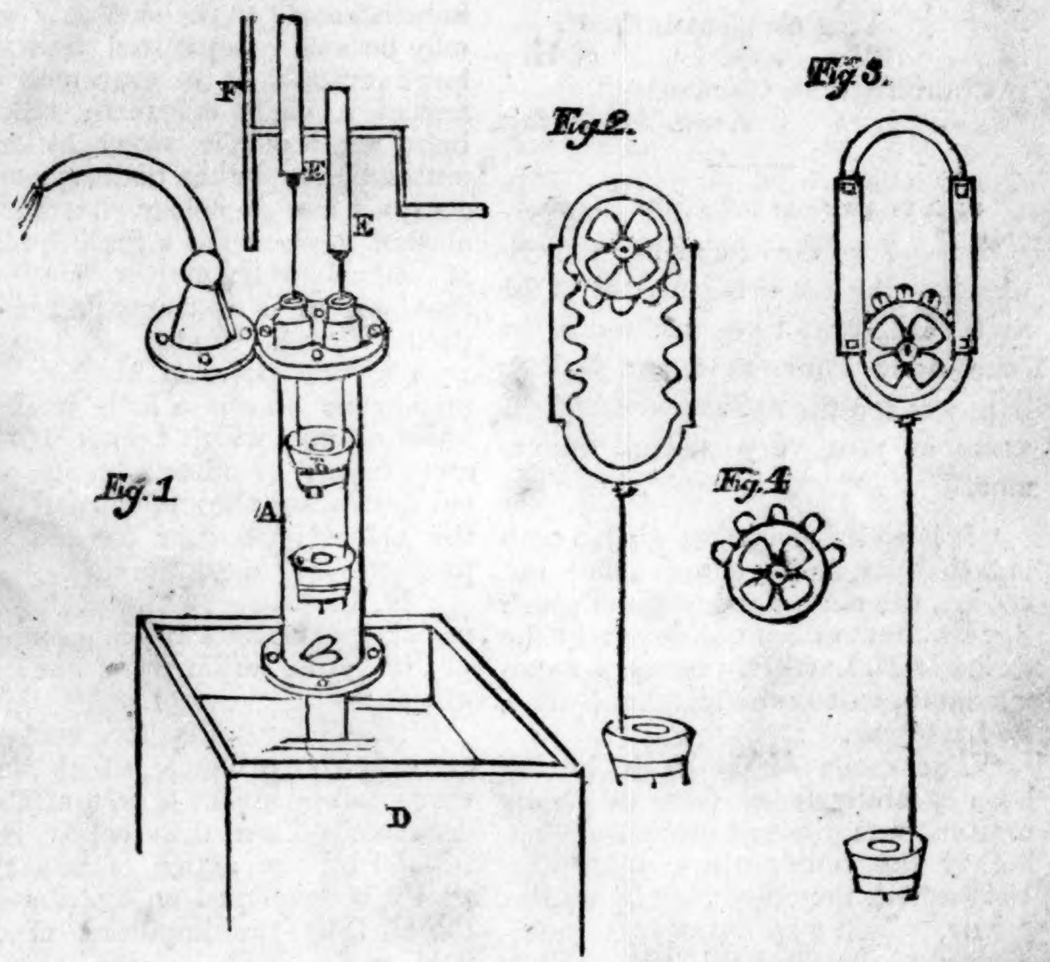
"The more widely Science is diffused, the better will the Author of all things be known, and the less will the people be 'tossed to and fro by the sleight of men, and cunning craftiness whereby they lie in wait to deceive—.'" *Mr. Brougham.*

SINGLE BARREL HYDRAULIC PUMP, WITH DOUBLE ACTION.



SINGLE BARREL HYDRAULIC PUMP.

SIR,

As an admirer of your interesting publication, and a member of the Mechanics' Institution, I cannot withhold any suggestion which I think may tend to promote your views. The many excellent articles which appear in your Magazine must greatly add to the cultivation of science, and elucidate much abstruse matter; permit me, therefore, to offer you the above Drawing and Section of a Single Barrel Hydraulic Pump, with a double action, which is both simple and easy, and may be applicable for many purposes where a double barrel cannot be conveniently fixed, or for deep wells. It may be worked by a crank or water-wheel, and will keep a continual stream as the pistons act alternately.

Description.

Fig. 1 represents the pump in full play.

F, the fly-wheel.

EE, the plates in which the cog-wheels travel.

B, the pistons in the barrel, A, drawing from a tank, D.

Fig 2 is a section of the plates, with the cog-wheel.

Fig. 3, the same, with the side plates screwed on to keep the wheels in their place.

Fig. 4, the wheel cogged half round, so that it travels up one side and down the other, which gives the two an alternate motion.

Your obedient servant,
B. H.

Church-street, Camberwell.

Lond. Mec. Mag.

COLOUR OF LOBSTERS AND CRABS.

Sir,—For the following experiments on the colouring matter of the shell of the crab I am indebted to the Journal de Pharmacie, and shall be happy to see the appearance of the same in your very useful Magazine.

"It is well known that when a crab is boiled, its shell assumes a fine red colour, the nature and origin of which have hitherto been unknown; at the desire of M. Latrille, a series of experiments upon it was undertaken by M. J. L. Lassaigne.

"The shells of the crab, having been carefully freed from all fleshy matter, was plunged into pure alcohol, of the temperature of 59 deg. Fahrenheit, they assumed a scarlet colour, which was instantly communicated to the alcohol The alcoholic solution of the colouring matter was then decanted, and new doses of alcohol added till it ceased to be coloured; the shells were thus exhausted of their property of becoming red in boiling water.

"From the spontaneous evaporation of the different alcoholic solutions, a red, and apparently fatty matter was obtained; this matter has no smell or sensible taste, is insoluble in cold or boiling water, but soluble in sulphuric ether and pure alcohol. This solution is of a scarlet colour; it is not disturbed by the addition of distilled water, which shows that it is not of a fatty nature. Its natural colour is not changed by potash, soda, or ammonia; the mineral acids have no action upon it when diluted with water: but when concentrated they destroy it by changing it to a dirty yellow. The salts of lead, tin, iron, and copper, do not precipitate this colouring matter from an alcoholic solution diluted with water.

"M. Lassaigne also examined the membrane, which in young crabs adheres strongly to the shell, but which may be easily separated from it in large crabs. It is extremely fine, and of a violet colour by reflected light, and a purple violet by transmitted light. When put into water it does not lose its colour, but in cold alcohol it gives out a great quantity of red colouring matter, similar to that which is extracted from the shell, though treated successively with several doses of alcohol. This membrane retains a little of its red violet colour, which cannot be taken away from it by other solvents, without destroying the membrane itself; the colouring matter has the same properties as that of the shell.

"M. Lassaigne has found the same principle in lobsters and other animals of the same order—and he concludes:—

First—That crabs, &c. contain a red colouring principle, which may be extracted by means of cold alcohol.

Second—That this colour is not formed by the action of heat; but that it is developed or distributed in the shell by the impulsion of that fluid.

Third—That there exists a highly coloured membrane, which appears to be the source of the colouring matter in that class of animals.

Fourth—That this colouring matter differs in its chemical properties from others obtained from the mineral and vegetable kingdoms."

Your obedient servant,
J. Marsh.

Woolwich, May, 1825.

ib.

NEW IMPERIAL MEASURE.

Sir,—I send you the following inside dimensions of the Quart, Pint, and Half-pint; also the thickness of metal of the top and bottom, and thickness of the bottoms, all in inches. I must beg leave to observe, that T. H. says, "the top diameter and perpendicular depth of each to be equal to the bottom diameter in proportion to the top as 7 to 10;" whereas, I presume, he means the top diameter and perpendicular depth of each to be equal, and the bottom diameter in proportion to the top as 7 to 10.

Your constant reader,

B. C.

April 20th, 1825.

	Top Diam. & Depth	Bottom Diameter	Thickness of Metal Top	Bottom	Thickness o Bottoms	Content
Quart	4 94477	3.46134	0.64262	0.44984	1.28525	69.3185
Pint	3.92466	2.74726	0.51005	0.35704	1.02011	34 65925
Half-pint	3.11500	2.18050	0.40483	0.28338	0.80966	17.329625

PROPOSALS FOR USING SPIRAL WHEELS IN STEAM NAVIGATION.

Sir,—The imperfections of paddle wheels for propelling steam vessels are generally known, and have given rise to various contrivances for obviating them, for some of which patents have been obtained. These contrivances, it should seem, have not been very successful, as paddle wheels appear to be universally in use; it is, therefore, desirable that this subject should have the continued attention of mechanics, as their enlightened diligence cannot fail to have very beneficial results; and it is for the purpose of communicating an idea which I conceive may contribute to produce an improved method of propelling such vessels, that I now address you.

The most obvious imperfections of paddle wheels are, first, the great loss of power occasioned by the oblique pressure of the paddles on the water when they first enter it; and which, though gradually diminishing, is not wholly lost till the paddle becomes vertical. This oblique pressure may be resolved into two forces, the one vertical, the reaction to which raises the vessel, and the other horizontal, which propels it forward, and it is obvious that the whole power of the engine is excited in the latter direction only at the moment when the paddle is vertical; after this the vertical pressure begins in the opposite direction, and contributes to press the vessel into the water, and thus counteracts the little advantage that the first might produce, by lessening the draught.

And secondly, the unequal depth to which the paddles are frequently immersed when either the water is much agitated, or the wind acts forcibly on one side of the vessel: the consequence of this is, that one of the wheels suffers the impediment last mentioned in a great degree, and is turned with a greater loss of power; whilst the other has not sufficient hold of the water to produce its maximum of effect.

The mode of propelling steam vessels to which I would call the attention of your intelligent Correspondents, particularly those engaged in constructing or navigating them, is to substitute for paddle wheels a worm-like spiral wheel (if it may be so called) that shall work in the water in the manner of a screw, to be formed by a flat board of ledge wound spirally round an axle, just like the screw of Archimides, without its external rim; one of these on each side of the vessel placed with their axles longitudinally, at any depth that may be found convenient, but somewhat below the water's surface, would produce a progressive motion, accompanied by very little collateral resistance, with a very gentle agitation of the water, and with very small loss of power.

The pressure of these spiral wheels upon the water being an oblique one, which may be resolved into two forces, one of which acts in the direction of the axle, and the other per-

pendicular to it, it is obvious that this latter force would soon drive the vessel against one of the banks in rivers, and athwart the keel in the open sea, were they both to work the same way; but by making them turn in different directions, the lateral force of each would be counteracted by the other: but whether it would be better to drive the water in a direction diverging from the sides of the vessel, or converging towards its rudder, will be best determined by practice.

The objection which I foresee to this machinery is, first and principally, the room which it would occupy on the sides of the vessel under the surface of the water, being equal to the diameter of the spiral, the radius of which would probably be not less than eighteen or twenty inches, more or less, according to the size of the vessel, thus filling a space of perhaps three feet and a half on each side; and though, by being placed lower, it probably would not increase the width of the vessel more than paddle wheels do, yet that circumstance would render it inconvenient in difficult navigations, and may much restrict its use in rivers and canals, though I do not aprehend that this will be a material objection to vessels navigating on the sea,

A second objection may be founded on the velocity of the rotatory motion required to produce a given progressive motion. It is easily perceived that the progressive motion acquired in one revolution of the spiral wheel cannot exceed the distance of its threads from each other, but must indeed be somewhat less, owing to the yielding nature of the water; whilst that obtained by one revolution of a paddle wheel bears a great proportion to its circumference; but this objection, I think, will be overbalanced by the diminished force required to turn the spiral wheel, and the small proportion of it that will be inefficient.

I will not trouble you with any farther observations, my object being to draw the attention of your Correspondents to this subject, for the purpose of ascertaining its practicability If you think the suggestion worth publicity, a page of your very useful Magazine will oblige

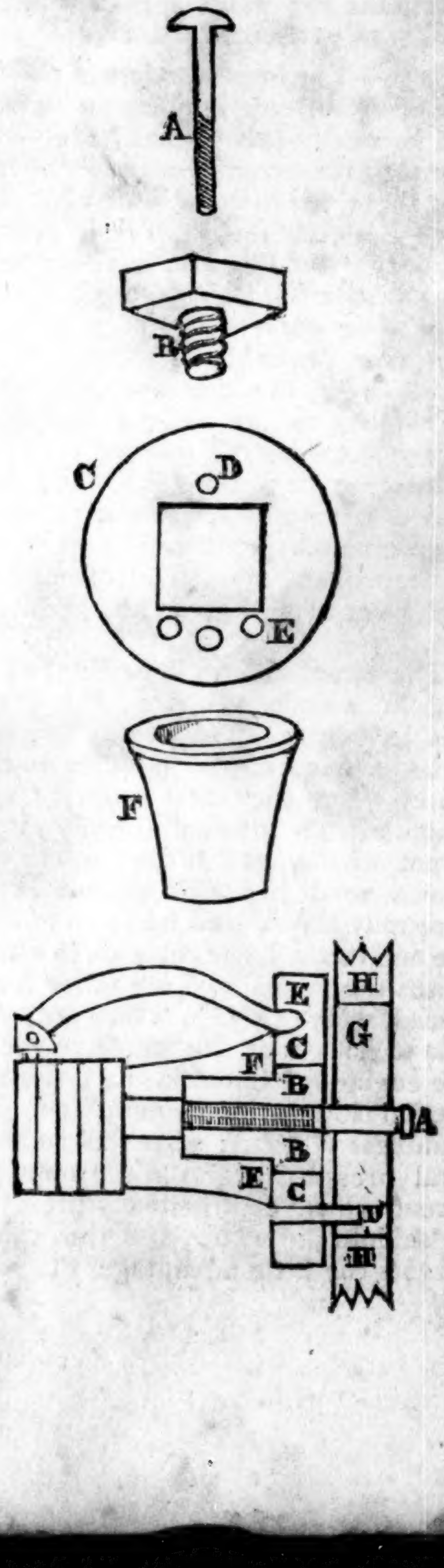
T. M——s.

——, near Boston. *Lond. Mec. Mag.*

COMBINATION LOCK SECURITY.

SIR,—Agreeable to your wishes, I send you a sketch and description of a Horizontal Combination Lock Security, for door and other locks, of my invention.

G. M. H——N.
Lieutenant, Royal Navy.



Explanation of the Drawing.

A is a circular piece of stout wire, with a cross piece at one end, of a size for introducing into a key hole, and formed as a screw at the other.

B, is a circular piece of iron or brass, having at one end a square shoulder, of about two thirds of an inch square, and about a third or half an inch thickness;—on the circular part a screw is to be made, of five or six threads, close up to the shoulder. In the centre of this piece, B, form a corresponding thread to the screw, A, quite through.

C is a circular plate, iron or brass, of the same thickness as the shoulder of B; in the centre of C a square is cut though, to fit easily over the shoulder, B.

D is a small piece of iron, half an inch projection, fixed in, just beneath the centre of one of the squares of the aperture in C. On the opposite side make three holes, quite through, on a parallel with the circle of C, about the size of a crow quill; call these holes E.

F is a conical piece of iron or brass, of about two thirds of an inch long, flat at the ends, about an inch diameter at its base, and its small end agreeable to the size of the diameter of the combination lock, to be applied to this end. At the base and centre of piece F, form a corresponding screw to the screw of B, sufficiently deep to make the shoulder or base of F come close against the shoulder B.—At the small end of F, and centrical, form a screw orifice, corresponding to the screw end of any combination lock you mean to use for the purpose. The common combination locks now in general use will apply to this purpose, by taking away the end-piece from the screw, and having a bar-bolt made longer, as I shall hereafter mention. The mode in which this horizontal combination lock security will apply, is thus:—

Proceed with ABCD as specified in my Lock Security, inserted in your Number 46; the base end of this conical piece, F, in the present sketch, is then to be screwed on to B, tight against the piece C.—Having fixed your letters or figures of your combination lock to your fancy, screw into your small end of piece F the screw of your combination lock; and so contrive this screw, when screwed tight in its place, to bring the bar bolt uppermost, and in a line with one of the holes, E; and let this bar-bolt be of such a length, when the combination lock is drawn out for unlocking, that the end of this bolt shall lift up clear, and disengage itself from the hole, E, and the circular plate, C.

In unlocking this security, there will never be any necessity for unscrewing your combination lock from your piece, F, unless for the purpose of altering your combination letters or figures, on suspecting your combination to be known; you need only to unscrew F from B, when the bolt is withdrawn. The machinery is taken off or applied in three pieces only, when once fitted to the door or chest you may have occasion for its use. I have not represented the combination lock as a section, but as applied with four combination rings, to the section of my machinery, in the position of locked, with the piece, A, transversed, as in a key hole.—The dotted lines, G, represent the key hole, and H as a part of the lock. *ib.*

A ROMAN BREAKWATER.

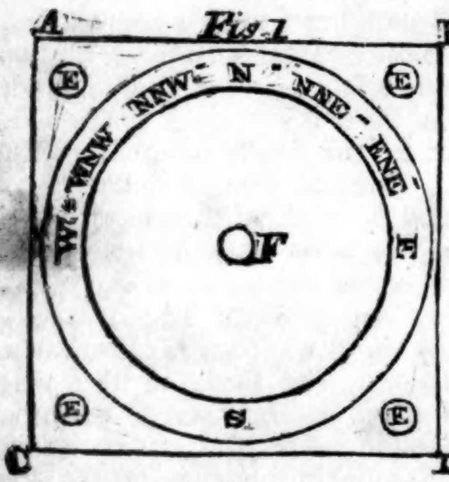
Pliny, in one of his letters says, "I received lately the most exquisite entertainment imaginable, at Centumcellæ (supposed to be Civita Vechia.) This delightful villa is surrounded by the most verdant meadows, and commands a fine view of the sea, which forms itself here into a spacious harbour, in the figure of an amphitheatre. The left hand of this port is defended by exceeding strong works, as they are now actually employed in carrying on the same on the opposite side. An artificial island, which is rising in the mouth of the harbour, will break the foroe of the waves, and afford a safe passage to ships on each side. For the construction of this wonderful instance of art, stones of a most enormous size are trantported hither in a sort of pontoons, and being thrown one upon the other, are fixed by their own weight, gradually accumulating in the manner, as it were, of a sand bank. It already lifts its rocky back above the ocean, while the waves which beat upon it, being tossed to an immense height, foam with a prodigious noise, and whiten all the sea around. To these stones are added large piles, which in time will give it the appearance of a natural island. This haven is to be called by the name of its great author, (Trajan) and will prove of infi-

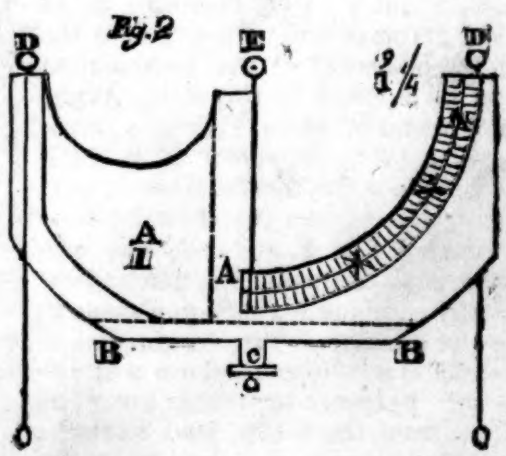
nite benefit, by affording a very secure retreat to ships on that extensive and dangerous coast. *ib.*

COMMON WAX OR VARNISHED CLOTH.

The manufacture of this kind of cloth is very simple. The cloth and linseed oil are the principal articles required for the establishment. Common canvass, of an open and coarse texture, is extended on large frames, placed under sheds, the sides of which are open, so as to afford a free passage to the external air. The manner in which the cloth is fastened to these frames is as follows:---It is fixed to each side of the frame by hooks, which catch the edge of the cloth, and by pieces of strong pack-thread passing through holes at the other extremity of the hooks, which are tied round moveable pegs in the lower edge of the frame. The mechanism by which the strings of a violin are stretched or unstretched, will give some idea of the arrangement of the pegs employed for distending the cloth in this apparatus. By these means the cloth may be easily stretched or relaxed, when the oily varnish has exercised an action on its texture in the course of the operation. The whole being thus arranged, a liquid paste, made with drying oil, which may be varied at pleasure, is applied to the cloth. *ib.*

FRENCH MACHINE FOR TAKING MERIDIAN LINES.





SIR,—One of the objects of your valuable Magazine appears to me to be, the giving publicity to whatever tends to facilitate the march of science, either by the revival of old, or the production of new instruments.

About fifty years ago, I bought, in Paris, for twelve livres, a machine for taking meridian lines. Not having met with one similar to it, either in simplicity of workmanship, or low value of material, I send you the accompanying rough, but I hope intelligible draft of it, and remain

A. H. ROWAN.

Description.

Fig. 1.

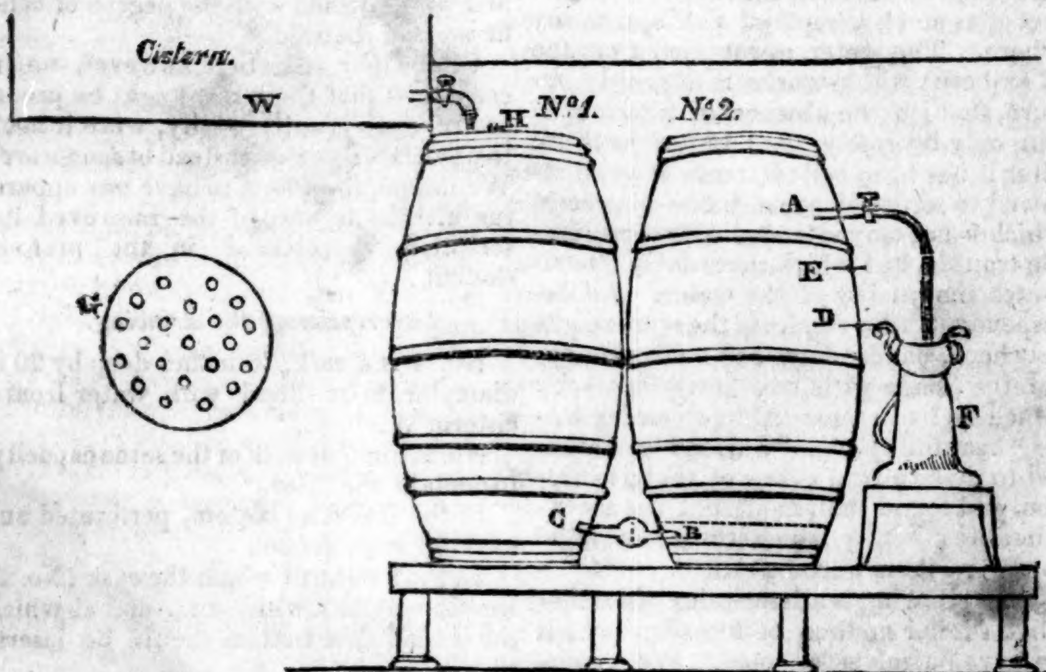
ABCD, a plateau of wood, with four screws, E, to bring it to a level; a circle of paper glued in it, with the points of the compass; F, a hole to receive the neck of the second part to traverse in; nut, &c. at bottom.

Fig. 2.

A is the machine, made of three pieces I suppose to prevent warping, marked by dotted lines. It stands nine inches above the plateau, and is 13 1-2 inches from out to out of the horns, which, at D, are three-eighths of an inch; the thickness is one inch and a half. On A 1 is a paper

glued on, divided into 90 deg.; D are two screws, round which are passed silk threads with conical plummets at the ends overhanging, and regulated, as to perpendicular, by lines marked on the ends of the machine. E is a swinging eye-glass, fixed at right angles, so as to receive and transmit the sun's image on the graduated line. To use it, mark the degree where the sun's image is subdivided by the lines of degrees; lower the screw, E, and mark the point of incidence of the plummet, remarking also the height of the sun on the line of degrees before noon; then turning the upper part on its axis, the bottom remaining steady, so as to catch the sun's image in the afternoon at precisely the same height on the scale of degrees, mark that point also, with each plummet, as before; remove the machine; join the two points made by each plummet, bisect each of these lines, join the points of bisection, and that line will be the meridian line of that spot. *ib.*

IMPROVED FILTERING APPARATUS.



Sir,---Having come from Yorkshire to spend this season of festivity among my friends in town, I have been somewhat surprised to find, that where I expected to observe every thing depending on the skill of man in a state of the highest perfection, many things which seem to call for but little of that skill, and are yet objects of the first necessity, are no better than elsewhere---nay, not half so good. I would particularly instance the exceeding impurity of the water with which the knowing folks of the metropolis are in general supplied. I have nearly gone the round of my town cousins, and, strange to say, have not been able to obtain rom one of them a glass of water fit to drink. Need I descant, sir, on the importance to the health of having this indispensable article of life of as salubrious a quality as possible, or on the many diseases and infirmities which must be engendered, where it contains, as in London, such an abundant admixture of mud, insects, and other impurities? I should suppose, sir, that it could be no difficult matter to remedy this grievance, especially now-a-days, that men of science and philosophy are condescending to bestir themthemselves a little about the affairs of ordinary life; and to you, as somewhat distinguished in this way, I take the liberty to address myself on the subject, in the hope that you will ei-

ther yourself point out, or, by submitting the matter to your numerous scientific readers, induce some of them to show how the good people of London may cease from drinking such aqueous abominations, and be able (when next he visits them) to give a glass of pure water to

A YORKSHIRE GRAZIER.

The impurity to which our Correspondent directs our attention, is undoubtedly one of very serious moment, and felt (we believe) very generally throughout the metropolis. In the district where we reside (Christ Church, Surrey) it is a subject of as much complaint, perhaps, as any where. The water, as supplied from the (Lambeth) water-works is so grossly impure, that (in the absence of filtering) it can only be safely used in food or drink after it has been boiled, recooled, and allowed to settle for some time—a process which is not only attended with considerable trouble, but which necessarily deteriorates the quality of the water. A Correspondent, who resides in the same neighbourhood, having described a filtering apparatus (made with two flower-pots) by which he had succeeded in obtaining water "beautifully clear," a friend was induced to make a trial of one of that description, and found that, in all but the inconsiderable quantity which it was calculated to supply, it answered well.

The following is a description of a somewhat similar method of filtering, which we have ourselves adopted. We procured a cask, somewhat less than a porter hogshead, but of a different shape, in order to give the better effect to the filtering process, being 40 inches deep on end, and 20 inches in diameter at the top and bottom. We then had a second or false bottom made, and perforated by a three-quarter inch gouge with about 18 holes; this we grooved into the cask about four inches above the undermost or real bottom, and covered it over with four plies of coarse flannel. Our next business was to procure a quantity of coarse *fresh water sand* (for in a trial which our friend made with the flower-pots he found that small or sea sand would not answer the purpose) and with this we filled the cask to the height of 20 inches from the false bottom, beating it hard down as it was put in.—Above the sand we inserted another false bottom, perforated like the former, but not grooved into the cask; and over that again two plies of flannel. We then added layers of sand and pounded charcoal alternately, for the height of ten inches more, and above these placed a lid, perforated and covered with flannel, like the two false bottoms. The six inches of the cask which were now left unoccupied, we appropriated to the water to be filtered; a space equal to the reception of from eight to ten gallons. On making an experiment with the filter we had thus constructed, we found that the water, however impure when first put in, came out as clear and sparkling as crystal; and finding, on a continued trial, that we can procure in this way more than twenty gallons of such water every twelve hours, we rested at first well satisfied with the degree of benefit we had realized.

On farther reflection, however, we are convinced that the water might be produced of even greater purity, were it made to percolate *upwards* instead of *downwards*. We intend, therefore, to have our apparatus altered to one of the improved description represented in the prefixed sketch.

Description of the drawing.

No. 1 is a cask, 40 inches deep by 20 in diameter, to be filled with water from a cistern, W.

No. 2, another cask of the same capacity, to contain the filter.

B, the first false bottom, perforated and covered with flannel.

D, the height to which the cask (No. 2) should be filled with sand, and at which the second false bottom should be inserted.

E, the lid, between which and D equal quantities of sand and charcoal are to be interposed.

C, communicating cock between the two barrels.

A, a cock to discharge the pure filtered water.

F, a vessel to receive the water.

G, the false bottom, to be grooved into the cask No. 2.

H, a ball-cock, to regulate the filling of the cask No. 1.

An apparatus of the kind we have described, must obviously have great advantages over any filter that can be made of stone. By removing the upper lid, E, whatever refuse may gather on the top can be skimmed off occasionally. New layers of sand, and charcoal too, can be introduced with great ease, so that the apparatus can, with very little trouble, be

kept at all times in tolerable efficient action, and may, at a little expense, be renovated entirely, whenever that is found necessary. All the stone filters, on the contrary, that we have ever seen, get rapidly clogged with the earthy deposits from the water, and if not frequently cleaned out, soon cease running altogether.

DARKNESS NOT MATTER.

SIR,—It affords me much pleasure to have the opportunity of replying to your Correspondent, Mr. Jacob Morine, as I cannot but think he writes from conscientious motives; for, morally speaking, as human nature admits of no greater perfection than a man's acting from conscientious motives, what is done in this spirit cannot but be well received. It does not follow, however, that conscientious opinions are always rationally right, although it is the fact, that however erroneous in this respect they may be, they cannot be wrong morally, as no one will accuse himself or another of moral turpitude, in thinking that is right which is the contrary of what he believes is wrong, however much others may differ from him. Now, I conceive Mr. Morine is not as rationally right as he is persuaded in his own mind of being; and the high authority he appeals to is one among numerous instances wherein our own misinterpretations are too frequently substituted for the word of God or the voice of Nature. As we are said, by experimental proof, to ransack nature for the truth, the literal expression, in other cases, is proclaimed to be the absolute intention of Deity; whereas, in both, by misinterpretation, error is substituted (and difference of opinion proves it to be so) for the absolute fact.

I challenge all the learned divines in the world in support of the opinion that darkness is not of a substantive nature; nor, since the world began, did such an idea as the materiality of darkness ever enter into the head of any philosopher whatever. What then can darkness consist in, but a mental affection or state of consciousness. Shadow, of consequence, is the same, and things perceived, when we imagine we see external shadows, is, of necessity, no other than a mental effect; hence it is obvious that the expression "thick darkness, which may be felt," is purely metaphorical language. And with not less reverence for the same authority, we are not obliged to consider, "Let there be light," in other than an equally figurative sense. For, as perception is the *consequence* of sensation, it follows that what is perceived is, in all cases, of a mental nature only; however, from organization and habit, we may be inclined to think otherwise: and as sensation supplies what matter can noways be possessed of, it were as much in vain to have created that which organization creates, as it is absurd to suppose matter to be light or luminous, that is, similar to a state of consciousness. That seeing, is not perceiving any thing outside of us, is evident from the thing seen being what sensation consists in, and from its being colour, which is seen which is not a quality of matter; in which case a universe of light or luminous matter could afford no assistance whatever towards our discovering external bodies. Besides, did radiant matter flow from bodies into the eye, it proves only that external bodies are not seen, or this reflection of rays would be useless; and also that what is perceived is a subsequent mental formation, after sense excitement has been promoted; so that neither externally no internally is there any necessity for the existence of light in a physical sense.

I hope Mr. Morine is now convinced that something more rational and becoming was meant by my paper, than a mere triumph of words at the expense of all respect for what every one holds sacred.

I shall now add a few comments on the remarks of a Correspondent on the above mentioned paper of mine, which I should have replied to at the time, but for its being anonymous. That writer insinuates that none but wiseacres differ from Sir Isaac Newton's opinions, and that in doing so they aim at "tumbling that great philosopher from an elevation which has been so long accorded to him by universal suffrage." For my own part, I make bold to say, there is nothing true in "*The Optics*" from beginning to end, but the mathematical demonstrations of the diagrams, if light be nothing physical, and I defy the possibility of proof that it is: on the contrary, its existence as such is denied by all that reason and induction can advance, which afford the *only* species of proof the nature of the subject admits of; and, so far from aiming at underming the fame of Newton, by differing with him on philosophical topics, if the thing were anyways possible, it would be by that species of timid acquiescence which amounts to the fulsome consideration of his being an immaculate human being, and that science admits of no improvement beyond the

state in which he left it. Newton was the greatest philosopher in the world in his day; no individual since could say the same; and with ten thousand times his knowledge, in the coming ages of civilization, can more be ever said of any man? could his spirit present itself before the chair he has left comparatively unfilled until now how would it smile at mistaken *fellowships* who hold *his* name in *terrorem* over the heads of all who differ from *themselves*.—Would it not whisper thus:—"My friends! knowledge grows out of knowledge—do not unwittingly prevent it—I did no more than improve on the past, and with little or no aid from my contemporaries—you, who have immensity of aid, pursue the same course, and always consider our labours improveable."

Your obedient servant,

T. H. Pasley.

January 25th, 1825. *ib.*

ADVICE TO STAMMERERS.

It has been observed, in regard to stammerers, or those who have a defective utterance, that they can sing, or even read, without hesitation, although they cannot speak. What is the rationale of this fact? It will be found to depend on the following principle:—

Continuous muscular action is far more easily effected than that which is interrupted. This principle is even general in physiology. It has been remarked, that a drunken man, or a person affected with that disorder termed St. Vitus's dance, can run, though he cannot walk, or stand still. In the same manner, a stammerer can sing, which is continuous motion, although he cannot speak, which is interrupted.

Continued muscular motion is also attended with less fatigue than that which is interrupted; and this is particularly observed in regard to speech. It is on this account that there is a tendency, in those who speak much in public, to acquire a sort of sing-song mode of delivery, which it requires good taste and constant exertion to correct. It is on this account, too, that those who cry in the streets actually acquire a sort of tune, or cry, as it is termed; the continued action of the muscles of speech being so much more easy than the interrupted. The same is constantly observed in children on their first attempts to read. Let a stammerer then observe this rule:—Always to speak in a continued or flowing manner, avoiding carefully all positive interruption in his speech;—and if he cannot effect his purpose in this manner, let him even half sing what he says, until he shall, by long habit and effort, have overcome his impediment; then let him gradually, as he may be able, resume the more usual mode of speaking, by interrupted enunciation. It is understood that this is the principal means employed by those gentlemen who have undertaken to correct impediments in speech, and it is undoubtedly the most rational. In addition to this rule, let the stammerer endeavour to speak in as calm and soft a tone as possible; for in this way the muscles of speech will be called least forcibly into action, and that action will be least liable to those violent checks or interruptions in which stammering appears to consist.

It is scarcely necessary to remark, that there are other inducing causes of stammering, such as nervousness, which must be cured by different means. Of these it would be necessary to treat in an essay written expressly on this interesting subject. *ib.*

BROWN'S GAS VACUUM ENGINE.

We are informed that Mr. Brown has tried his engine with a piston, and that it is found to answer his most sanguine expectations.

A Company, we perceive, has been formed for applying this engine to the purposes of boat and barge navigation. They have begun by offering a premium of one hundred guineas for the best model, exemplifying the power when applied to the head, stern, or sides of a vessel, both in shallow and deep water, in canals and rivers. A premium of thirty guineas is also to be given for the second best, and twenty for the third best models.

ib.

HARD BLACK LEAD PENCILS.

Draughtsmen of architecture and machinery require for their use pencils harder than those of pure black lead, in order that they may draw extremely fine lines.

A common kind of these pencils has been long made for carpenters, by melting black lead dust with sulphur, and pouring the composition into reeds. These pencils have gene-

rally this hard black lead at one end, and a slip of red chalk at the other. It is singular, that although this composition appears solid, yet if the reed has an eyelet hole cut in the side of it, the black lead gradually, and that in no long time, protrudes, and forms a hemispherical excresence.

A Mr Varley has made a very superior kind of hard black lead, by melting black lead dust with shellac, several successive times; and when the composition is sufficiently smooth, it is to be sawn into slips, and inserted in the usual cases

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ANTIQUITY OF THE HYDROMETER.

The use of the hydrometer is very common in various business, but under many names; as that of aroemeter, gravimeter, or saccharometer.

It is a very ancient contrivance, and is described with great accuracy in an epistle of Synesius, bishop of Ptolemais, to the learned Hypatia, so that it must have been already known fourteen hundred years ago, if not earlier.

This instrument must, however, have been forgotten; and the famous German chemist, Tholden, better known by the name of Basil Valentine, who used it to ascertain the strength of brine, by showing it to Father Kircher, occasioned that Father to republish it as a discovery to the learned world. *ib.*

RELATIVE BURNING OF VEGETABLE OILS.

Scopoli made the following experiments on the burning of several vegetable oils, both as to the duration of the flame, and the quantity of soot that they yield while they are burning;---

Half an ounce of nut oil was three hours and four minutes in burning and it yielded twelve grains of soot.

Half an ounce of linseed oil was 3 hours and 29 minutes in burning, and yielded 11 grs. of soot

Half an ounce of olive oil was two hours and 55 minutes in burning, and yielded only 1 gr. of soot.

Half an ounce of rape oil was 3 hours and 24 minutes in burning, and yielded 3 grs of soot.

Half an ounce of nettle-tree oil (*celtis australis*) was 2 hours and 40 minntes in burning, and yielded only half a grain of soot.

These experiments demonstrate the superiority of olive and nettle-tree oil. *ib.*

ON MAKING BONE GLUE.

The French have of late years made a considerable quantity of glue from bones, which they consider as superior to the ordinary glue made from the skins of animals.

For the purpose of making this glue they use the refuse bone of the table-knife makers, and the skulls of oxen, from which the teeth have been extracted. These materials are soaked for about a week in water rendered very sour by the addition of a little spirit of salt; in which time they become quite flexible, and may be bent with ease. Being taken out of the acid, boiling water is poured on the bones, or rather glue, to separate any grease, and also the acid that adheres to it. The pieces of glue are then wiped, washed in cold water, and dried in the shade.

When this glue is to be used, it is boiled in water to a proper consistence.

There is a finer kind of bone glue made in the same manner from leg of mutton bones; which is used instead of isinglass by the French silk manufacturers.

The teeth extracted from the ox cheeks are sold to the apothecaries, who use them for the making of salt of hartshorn; as they yield a large quantity of the carbonate of ammonia, the scent of which resembles that of the true salt of hartshorn, and is free from the fetidity of salt of bones. *ib.*

ON THE DUTCH MODE OF BLEACHING.

The exquisite whiteness of the linen used at the inns in the provinces of Holland and Utrecht, is so striking to travellers even from England, that it is no wonder that the relations which took place between this country and the United Provinces during the reign of Elizabeth, and those of William and Mary, and Anne,

leading to frequent intercourse between the two nations—that some of our housewives, despairing of equalling this whiteness, sent their linen to Holland to be washed and whitened.

It is well known in the linen trade, that it is but lately, as we may say, that is, since the year 1752, that we have attempted to bleach the pieces of linen in a manner at all comparable to the Dutch linens, as they are called—but which are, in fact, the manufacture of Germany, and only bleached in the United Provinces, particularly near Haarlem, in the province of Holland. Before this time, not only the dealers in linen sent the pieces to Holland to be bleached, but even private families, who could afford to keep a sufficient stock, sent, as we have just said, their household and body linen to the same country; as it appears from several letters and account books now remaining.

Although the brilliant whiteness of body linen is not of such consequence at present, when our outward garments are closer than formerly, yet, as fashion is changeable, it is desirable to know the process used by the Dutch for whitening their linen, either in the whole piece or made up. It does not appear that they make any difference in this respect, but proceed with the one the same as with the other.

The most celebrated whitening grounds are those of Haarlem, situated about three miles from the city gates; the best are in the neighbourhood of the village called Bloemendal, or Vale of Flowers. The Dutch ascribe the wonderful whiteness of the linen washed here to the use of Russian pearlash; to the water of the Downs—which is nothing else than sea water, filtrated through the hills of sand, and bursting out from them perfectly sweet and clear; and lastly to the sea air, the whiteners being of opinion that no linen can be perfectly well whitened at any considerable distance from the sea.

When the Dutch undertake the washing and whitening of linen, they first steep it in ley where other linen has been previously trodden. It is then trod in a fresh-made ley of pearlash, poured upon it boiling hot. This ley is made very carefully, and left to clear thoroughly, by standing until as fine as wine before it is heated.—The linen is left for eight days in this ley, and after this first soaking it is washed and pressed in the following manner:—

Several buckets of buttermilk are emptied into wooden cisterns sunk in the ground; some of the linen is then flung into each cistern, and trod by three men for a considerable time. Afterwards more buttermilk is poured in, and more linen added, until the cisterns are nearly filled. Planks are then laid over the linen, and a strong upright of wood introduced between the planks on the linen, and a great beam, which goes across the cistern at a small height above it; and by driving wedges between this upright and the beam, the planks upon the linen are forced down, and the linen strongly pressed. It remains thus pressed for six or seven days, when it is taken out of the cisterns and examined; if not white enough, it is steeped again.

For coarse linen, a sour liquor, made of bran and water, is used instead of buttermilk.

After these operations, the linen is washed, first with black soap, then with clear water, and well wrung each time, by means of a machine; and then spread out upon the ground to whiten.

The whitening grounds are cut with canals in sundry places, that there may be no trouble of fetching water from a distance. The water of these canals comes from the Downs; to prevent the water from becoming thick and muddy, they are extremely careful in cleaning the canals. The washing tubs are built in with bricks, with two sluices for admitting or excluding the water, as is necessary. As this whitening takes up a whole summer, the linen was usually sent in March, and returned to this country in October following.

The prejudices against the use of potash and pearlash in washing linen, as tending to weaken its texture, probably owes its origin, like most other prejudices, to the outcry made by the contrary interest; that is to say, in this case, by the English whitsters and laundresses. That the alkali has not that destructive effect attributed to it, is evident from this simple fact, that Scotch linen, in the process of bleaching, is washed about fourteen times with a ley of pearlash, before it is fit for sale; and that the proportion of pearlash used in these repeated washings is at the rate of no less than two pounds of pearlash to the piece of thirty-five yards, or about one-fifth part of the weight of the cloth. *ib.*

THE LIFE OF A SAILOR.

How *melancholy* is the life of a sailor! From the first hour of his embarkation, his habits and modes of life become essen-

tially different from those of his brethren on shore.

His habitation is not fixed, and seems to have no foundation—now leaning to this side, now to that—acted upon by every wave and every breath of wind.

Even his food is unnatural: it engenders diseases, and can only be relishing from long habit.

Frequently he does not behold the face of cheerful WOMAN, green fields, or cottages, for months together; so sad are the watery deserts which he traverses, that a *solitary* and *sterile* land becomes to him an object of interest.

At night he slumbers in a narrow hammock, from which, in the midst of dreams of home, he is often roused by the sound of danger—rushing on deck, he finds the vessel driven before the blast, or laid down upon her side by a sudden gale; the remainder of the night is spent amidst cold and wet, and darkness and storms.

Even the morning light is hardly welbome, since it serves only to discover a turbulent and boundless ocean, in which he may possibly ere long be overwhelmed, and leave no sad memorial to tell his fate.

Yet to some how *pleasant* is the life of a sailor! Forever roving about, he enjoys without care that variety which the epicurean so sedulously and often so vainly seeks, as alone capable of giving a zest to the pleasures of existence. The fruits, the productions, the manners of distant climates, become to him as familiar as those of his own country. He sees nature under every aspect; and the widely-varying races of mankind, the Chinese and the Negro, the Indian and the Malay, are brothers with whom he has often conversed. It is the duty and pride of a sailor to struggle with the tempest, which inures his mind and body to fatigue and danger; but storms do not always vex the surface of the deep, nor do clouds always darken the face of heaven; at intervals favourable breezes bear him smoothly along.—He sees the sun rise from the eastern waves in all his glory, and disappear in the evening as in a sea of fire. He contemplates with pleasure the tropical clouds, the rich and splendid colours of which bid defiance to the art of the painter, and awaken to admiration even the rudest mind. He alone, with his level horizon, can contemplate, in all its magnificence, the star-light canopy of heaven, or the moon reflected on every side from a thousand broken waves. Who, then, would not undergo a few hardships and privations, to arrive at the enjoyment of objects so sublime?—How pleasant is the life of a sailor!

S. HOLLANDS.

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QUALITY OF FOOD IN REFERENCE TO THE HABITS OF LIFE.

The quality of food should have reference not only to age, but to habits. The richest aliment is by no means the best for every individual. In proportion as it affords chyle, it tends to repletion in those who take little exercise. If the merchant or artisan live freely on flesh, he suffers from feverishness, headach, or sluggishness. If the sedentary man of letters commit a like error, his mental, no less than his bodily faculties are oppressed or disturbed. In these, and similar cases, the secretions are considerably reduced; less is thrown off by perspiration; less is poured into the alimentary canal. Consequently the blood, the great source of all the animal fluids, is expended in less quantity; and fewer materials for its regeneration are required by the system. The quantity of chyle should be reduced to a balance with the consumption effected by the secretions. If full meals be taken, vegetables should form a large proportion.—On the other hand, the countryman who gains his livelihood "with the sweat of his brow," may safely charge his blood-vessels to the plenitude of health. No morbid plethora can take place, while the consumption equals the supply. His diet should be chiefly animal. On the same principle, the sportsman is hale and vigorous on a diet which would make the sedentary apoplectic. Capt. Barclay during his astonishing walk of 1000 miles in 1000 successive hours, took daily from 5 to 6lbs. of animal food. It should be remembered, that in civic life a state of full health cannot be maintained. It soon becomes the settlement of disease. Sometimes you see the citizen robust and florid as the peasant; but ere long you will find him labouring under an oppressive affection of the brain or other serious disorder. The full health even of men trained for boxing, or running, soon declines. Horses fed and trained for the course, lose their vigor after a certain time. The game cock often dies, if he be prevented fighting at the period for which he is prepared. If the excess of vital power, produced by his diet, be not spent on an extraordinary effort, it becomes the pabulum of disease.

It is also probable that a diet excessive-

ly rich, though balanced by proportionate exertion, will, if long continued, considerably shorten the duration of life.—*Thackah's Lectures on Digestion and Diet.*

HURTFUL INFLUENCE OF BAKER'S BREAD.

A Correspondent of a medical publication says, "A physician of extensive practice and long experience," has made the following remark:—

"Out of fifty cases of indigestion and its consequent calamities, thirty-nine, on an average, may be cured by obliging the patient to use home-made bread, instead of that which is made by the baker." The writer of this article, also a medical man, can confirm, from his own experience, as well as an extensive practice, the truth of the above remark, communicated to him by a brother physician. Baker's bread is a perfectly *sui generis* substance, and is unlike any other bread. It always contains a portion of alum, and the sub-carbonate of potash, and some other unknown ingredient. The proof of good bread is its keeping. Country bread will keep good a week, and this is a better test of the genuinenesss of bread than the usual test employed for alum. Baker's bread binds the bowels, and produces nervous disorders, in many persons, of an alarming kind; and the writer well remembers the improved health enjoyed by the students of the college at which he was educated, after the medical professor had forbidden the use of baker's bread, and an oven had been erected for the college baking.

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MAGNETISM OF THE HUMAN BODY.

Mr. Partington, who is now lecturing on natural philosophy at the Russel Institution, noticed, in his last lecture on magnetism, a very curious fact, which seems to show that animal magnetism is not entirely a chimerical notion.

While making the necessary arrangements for his lecture, a lady approached the table, and brought her hand nearly in contact with a magnetic needle, and, to the surprise of the professor, he observed that the bar was attracted. He hesitated to ascribe this phenomenon so accidentally occurring to his notice, to the power of magnetism, and conceived it to arise either from gravitation, or from a disturbance of the electrical equilibrium; but, on requesting the lady to repeat the approach of her hand, found that an attractive or repulsive force was exerted alternately, by presenting either the thumb or finger of the same hand.

Mr. Partington observed, that this singular circumstance appears to place Mesmer's assertion, that the human body possesses polarity, beyond the power of contradiction; and, upon this ground, the professors of animal magnetism may be entitled to more respect than the experimentalists have hitherto been disposed to concede to them.

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ON THE IMITATION OF FOREIGN CABINET WOODS.

Although many of the foreign woods are to be had in sea-port or large towns at a reasonable price, and at all times; yet the fashion of using these woods in preference to the native being general, means have been found to give to native woods the appearance of the foreign.

For this purpose, pear wood, walnut wood, or St. Lucia wood are usually chosen to be altered. The name of the latter wood has occasioned many mistakes: it has been taken for a West Indian product, and as coming from the island of St. Lucia; whereas it is no other than the wood of the Mahaleb, or perfumed cherry wood. This wood grows naturally in the south of Europe, and has long been cultivated in gardens. The barbers of the south of Europe use the infusion of it to make their lather, on account of the agreeable smell it communicates to water. And the village of St. Lucie, in Lorraine, where the wood grows abundantly, having been led to turn a number of articles from it, the wood acquired this name, from the extensive trade carried on in these toys.

Many of these imitations are very inferior to the woods they are intended to resemble.

The wood ought to be well planed and polished with Dutch rushes or pumice stone, that it may take the colour in a uniform manner. The

pieces into which it is sawn ought not to be too thick, but rather in slips or veneers, that they may be covered by the dyeing bath. If the wood is in thick pieces, the dye is applied hot by repeated washes.

It is advantageous to keep the wood in a hot room, or even a stove, for a day and night, to get rid of the moisture, and render it dry.

When much wood is to be dyed, a long copper, like a trough, is most convenient: in a vessel of this kind set in brick work, the wood may be boiled in the different baths until the colour has penetrated a quarter of an inch deep.

But if the wood is too large to be boiled, the boiling liquor is to be washed over the wood with a soft brush four or five times, according to the porousness of the wood; taking care that each washing over is dry before the next is laid on.

Sycamore wood, dyed by an infusion of Brazil wood, either by itself or with madder, is made like light-coloured mahogany; if alumed before the Brazil is applied, and finished with a wash of verdigris, it resembles pomegranate wood: if, after being dyed with Brazil wood, it is washed over with spirit of vitriol, it resembles coral wood.

Sycamore, dyed with the nankeen dye, that is to say, annotto and subcarbonate of potassee, imitates light-red mahogany; if dyed with gambooge, dissolved in spirit of turpentine, it imitates citron wood; if dyed with an infusion of madder, and the dyed wood washed over with a solution of sugar of lead, it becomes a veined brown wood; but if the second wash is given with spirit of vitriol, it becomes a veined green wood.

Sycamore, dyed with logwood alone, imitates brown mahogany; but if the logwood dye was very strong, and the wood is afterwards washed over with a solution of verdigris, the wood becomes quite black.

Maple wood, dyed with Brazil, imitates light coloured mahogany;—with turmeric it imitates yellow wood; with logwood brown mahogany; with logwood, and then washed with spirit of vitriol, coral wood; with logwood, the wood being previously alumed, it becomes brown; with logwood, and then washed with verdigris, it becomes black.

Poplar wood, dyed with Brazil wood and madder, imitates dark mahogany.

Chesnut wood, dyed with saffron, or old chesnut, dyed with gambooge, imitates dark mahogany.

Beech wood, dyed with turmeric, becomes yellow; with madder, and then washed with spirit of vitriol, it becomes green with veins; and being first alumed and then dyed with logwood, it becomes brown.

Aspen wood, dyed with turmeric, becomes yellow, with alum first, and then logwood, brown; with a strong dye of logwood, and then washed with verdigris, black.

Limetree wood, dyed with turmeric and muriate of tin, becomes orange-coloured; with madder, and then washed over with sugar of lead, brown with veins: with a strong bath of logwood, and then washed with verdigris, black.

Peartree wood, dyed with gambooge or saffron, becomes a deep orange satin wood.

Hornbeam, dyed with Brazil wood or logwood, and then washed with spirit of vitriol, imitates coral wood.

Planetree wood, by the same means, also imitates coral wood, that is to say, the wood of the courbarel; dyed with madder alone, it imitates lignumvitæ; with madder, and then washed with sugar of lead, it becomes brown with veins; dyed with madder, and then washed with spirit of vitriol, a veiny green wood; with a strong bath of logwood, and then washed with verdigris, black.

Elm, dyed with gambooge or saffron, imitates lignumvitæ.

When the wood is properly coloured, and thoroughly dry, it should be polished with Dutch rushes. *ib.*

ON ALUM.

It is well known that the pure sulphate of alumine does not crystallize without the admixture of potasse or ammonia. To introduce these alka-

lies our own manufacturers use kelp and urine; but the French have introduced the use of the sal enixum, or sulphate of potasse of the manufacturers of aquafortis or nitric acid; that of the sulphate of potassee which is the residuum of the oil of vitriol houses; and that of the sulphate of ammonia prepared from rough bone spirit saturated with oil of vitriol. To these may be added the sulphate of ammonia prepared from the ammoniacal liquor of the gas works.

As these articles are of different prices at different places, and also as they are not always of the same degree of power, it is necessary to ascertain the quantity of alum that they, or the impure subcarbonates of potasse will yield with the alum liquor of the works. For this purpose two ounces of a fair average specimen is ground in a mortar, and forty eight ounces, that is to say, three pounds of alum liquor thoroughly saturated, and being generally the mother water of some liquor that has been crystallized, is added; the mixture is then heated till it boils, and immediately covered up and set in a cellar to crystallize. The crystals are carefully collected, placed upon a filter, left twenty-four hours to drain, then washed half a dozen times with a saturated solution of alum, drained each time for an hour, then dried with blotting paper, and at last weighed.

The pure sal enixum, or sulphate of potasse of the aquafortis makers, generally produces nine ounces, or four times and a half its own weight of alum.

The sulphate of potasse from the oil of vitriol makers varies very much, and produces from one to three ounces of alum, or from one half to one and a half its own weight.

It is usual in France to employ both sulphate of potasse and sulphate of ammonia, if they can be procured at a reasonable price; but the manufacturers cannot always obtain the latter. It is computed that the existing manufactories in France can furnish only 120,000 kilogrammes, or 264,760lbs. avoirdupois, capable, of course, of crystallizing 1,588,560lbs. of alum, and including the usual addition of one fifth part of suplhate of potasse, *i. e.* 25,000 kilogrammes, or 55,158lbs. avoirdupois, which is itself capable of crystallizing 100,000 kilogrammes, or 220,634lbs. avoirdupois of alum. The whole quantity of alum that can be manufactured from these two salts is only equal to 820,000 kilogrammes, or 1,890,194lbs., which is only about the third part of the alum made in France, reckoning it at 2,450 tons English yearly.

The use of sulphate of ammonia is indeed more expensive than that of an equivalent crystallizing quantity of sulphate of potasse; but this greater expense is compensated by the saving of fuel and labour. This saving depends upon the solubility of sulphate of ammonia being much greater than that of sulphate of potasse; it requires sixteen ounces of cold water, or six ounces of boiling water to dissolve an ounce of sulphate of potasse; whereas a single ounce of boiling water, or two of cold water will dissolve an ounce of sulphate of ammonia. Hence the use of sulphate of ammonia as a crystallizer in alum works allows it to be added to a very highly charged alum liquor, by which means an abundant separation of small crystals of alum takes place immediately without any fire; but this effect cannot be obtained by the use of sulphate of potasse, which takes too much water to dissolve it.

ib.

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